FINAL DRAINAGE REPORT FOR
FALCON BIG R STORE EXPANSION
14155 E HIGHWAY 24
COLORADO SPRINGS, COLORADO 80831

December, 2021

Prepared For:

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Prepared By:

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Job No. 2170.00

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APPENDICIES

DRAINAGE REPORT STATEMENT

Design Engineer's Statement

This attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

_____

L DUCETT, P.E. 32339 Seal

Developers Statement

I, _____ the developer have read and will comply with all of the requirements specified in this drainage report and plan.

_____

Business Name

By: _____

Title: _____

Address: _____

_____

El Paso County Approval:

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 & 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

_____ _____

Jennifer Irvine, Date

County Engineer / ECM Administrator

Conditions:

Purpose

The purpose of this Final Drainage Report is to identify and analyze the existing and proposed drainage patterns, determine proposed runoff quantities, size drainage structures to safely convey the developed runoff, and present solutions to drainage impacts on-site and off-site resulting from this development.

General Description

This Final Drainage Report is an analysis of the development of Falcon Big R Store Expansion (AKA Part of SE4NW4 & Part of SW4NW4 Ly Sely of Hwy 24 & Part of NE4NW4 Ly Sely of US Hwy 24 & Swly of C/L of R/W No 1 Desc in Bk 2055-502) owned by Store Master Funding VIII LLC. The site is located at 14155 E Highway 24, Peyton, CO 80831 in Section 33, Township 12S, Range 64 West of the 6th Principal Meridian in El Paso County. The site is bounded on the northwest by Highway 24, on the northeast by That Part of NW4NE4 and of NE4NE4 Ly Sely of Hwy 24 and Nely of C/L of R/W 1 Des in Bk 2055-502 Sec 33-12-64 That Part of SW4SE4 Ly Sely of Sely R/W of Hwy 24 Sec 28-12-64, Ex That Pt Conv to County R/W by Rec #215093260, on the east by SW4NE4 Sec 33-12-64 Ex Pt to Stapleton Dr Row to County Conv by Rec #215138139, on the southeast by NE4SW4 Sec 33-12-64 Together With R/W For Ingress + Egress as Des in Bk 2533-401, and on the southwest by Lot 2 Sun Prairie Sub Filing No 1. The site is currently unplatted.

The site is currently used for merchandising. There is an existing 43,000 SF retail building, a 5,500 SF Auto Repair Building, two hay barns, a retail storage yard, along with associated parking on the southwest area of the site.

Proposed is the addition of a 10,000 square foot addition to the existing retail building. This addition will also be used for retail. Also proposed is new asphalt pavement and striping in the adjacent parking lot. Two existing storm inlets and associated storm pipes will need to be removed as the pipes seem to be located underneath the proposed addition's footprint. Concrete pans and associated grading will be installed to deal with stormwater resulting from the proposed development.

The site lies within the Haegler Ranch Drainage Basin and drains into Black Squirrel Creek.

Soils Condition

The soil for this project is composed of about 99% Columbine gravelly sandy loam and about 1% Stapleton sandy loam per the "Soils Survey of El Paso County Area. The Columbine soil is in Hydrologic Soil Group A and the Stapleton soil is in Hydrologic Soil Group B.

Drainage Criteria

Hydrologic and Hydraulic calculations were performed using the El Paso County Storm Drainage Design Criteria Manual Volumes 1 & 2, latest editions. The Rational Method was used to estimate storm water runoff and the design of the FSEDB was performed using UD-Detention v3.07.

Existing (Historic) Drainage Conditions

No previous drainage reports or studies could be found for this site. A drainage map for the existing conditions is included in the Appendix of this report. The site lies within the Haegler Ranch Drainage Basin. The existing topography generally has a 0% to 3% slope from the northwest to the southeast. The surface cover is composed of native grass in the undeveloped portions of the site while the developed portions are typically covered in asphalt. There is an existing pond on the northern portion of this site and an unnamed creek that splits the site in half that provides an overflow from this existing pond.

Runoff primarily sheet flows from the northwest area of the site and leaves the site at multiple locations at the south and east property lines which are designated as Design Points (DP) for analysis. At the northeast property corner (DP X1), runoff exits into a roadside ditch along Lazor Point where it then travels east to a culvert at Stapleton Drive. At the northern portion of the site (DP X2), runoff drains into an existing pond. At the southeast property corner (DP X3), runoff exits through an unnamed creek which eventually joins Black Squirrel Creek. At the south property line (DP X4, DP X7, & DP X8) runoff sheet flows onto the adjacent properties. Just north of the existing retail building, there is an existing 3' by 3.5' inlet in the parking lot (DP X5) and at the northwest corner of the retail building there is an existing 1' by 1' roof drain inlet (DP X6). These inlets are connected to 12" CMPs which join at an unknown location and discharge underground approximately 200' to the south of the south property line (DP X9). Runoff enters the site (DP OS-1) near the entrance to an existing concrete culvert. This culvert also releases an undetermined amount of stormwater from the unnamed creek that crosses Highway 24 at the site that is then channeled into the existing pond.

Basin EX-A contributes to DP X1 and has an area of 4.1 acres consisting mostly of native grass, generating runoff amounts of Q5= 0.81 cfs and Q100= 5.26 cfs.

Basin EX-B contributes to DP X2 and has an area of 4.5 acres consisting of native grass and pond area, generating runoff amounts of Q5= 1.76 cfs and Q100= 12.42 cfs.

Basin EX-C contributes to DP X3 and has an area of 10.9 acres consisting of native grass, generating runoff amounts of Q5= 2.30 cfs and Q100= 14.97 cfs.

Basin EX-D contributes to DP X4 and has an area of 13.4 acres consisting of both native grass and paved areas, generating runoff amounts of Q5= 9.91 cfs and Q100= 21.60 cfs.

Basin EX-E contributes to DP X5 and has an area of 1.1 acres consisting of both native grass and asphalt parking, generating runoff amounts of Q5= 2.57 cfs and Q100= 6.03 cfs.

Basin EX-F contributes to DP X6 and has an area of 0.3 acres consisting of mainly of roof area of the existing retail building, generating runoff amounts of Q5= 1.36 cfs and Q100= 2.64 cfs.

Basin EX-G contributes to DP X7 and has an area of 1.3 acres consisting of roof area and disturbed ground around the existing retail building, generating runoff amounts of Q5= 3.09 cfs and Q100= 6.62 cfs.

Basin EX-H contributes to DP X8 and has an area of 1.6 acres consisting mostly of native grass, generating runoff amounts of Q5= 0.39 cfs and Q100= 2.59 cfs.

Basin OS-1 contributes to OS-1 and has an area of 1.7 acres consisting of pavement and a roadside ditch, generating runoff amounts of Q5= 2.59 cfs and Q100= 5.93 cfs.

Developed Drainage Conditions

A drainage map for the proposed condition is included in the appendix of this report.

The proposed plans include the addition of a 10,000 square foot addition to the existing retail building. This addition will also be used for retail. Also proposed is new asphalt pavement and striping in the adjacent parking lot. Two existing storm inlets and associated storm pipes will need to be removed as the pipes seem to be located underneath the proposed addition's footprint. Concrete pans and associated grading will be installed to deal with stormwater resulting from the proposed development. The drainage pattern for the site remains generally the same; The exception being that the underground storm pipes are now routed above ground through proposed 4' concrete pans.

Runoff continues to exit into the ditch along Lazor Point (DP 1 & DP 3) in the same quantities as in the existing conditions.

Runoff also enters the existing pond (DP 2) in the same quantity as in the existing conditions.

Runoff exits DP 4 at higher quantities than in the historic conditions as it now takes additional drainage from DP 5 through approximately 1,000' of proposed 4' concrete pan.

DP 5 takes drainage from the entirety of the land being disturbed by the proposed building and parking lot additions in addition to most of the existing retail building and parts of the existing asphalt lots. This runoff discharges into riprap at the end of the proposed 4' concrete pan placed at the edge of the existing asphalt of the outdoor storage yard. Runoff at this design point now takes runoff that it did not take previously, but it is discharged to the southeast which is similar to the historic conditions.

DP 6 and will take runoff in the same amount and location as DP X8.

DP OS-1 will also remain unchanged.

Basin A contributes to DP 1 and has an area of 4.1 acres consisting primarily of native grasses, generating runoff amounts of Q5= 0.81 cfs and Q100= 5.26 cfs.

Basin B contributes to DP 2 and has an area of 4.5 acres consisting of native grass and pond area, generating runoff amounts of Q5= 1.76 cfs and Q100= 12.42 cfs.

Basin C contributes to DP 3 and has an area of 10.9 acres consisting native grass, generating runoff amounts of Q5= 2.30 cfs and Q100= 14.97 cfs.

Basin D contributes to DP 4 and has an area of 12.8 acres consisting of native grass as well as paved and building area, generating runoff amounts of Q5= 8.99 cfs and Q100= 20.01 cfs.

Basin E contributes to DP 5 and has an area of 3.3 acres consisting of building, paved area, and native grass, generating runoff amounts of Q5= 7.64 cfs and Q100= 15.19 cfs.

Basin F contributes to DP 6 and has an area of 1.6 acres consisting mostly of native grass, generating runoff amounts of Q5= 0.39 cfs and Q100= 2.59 cfs.

Basin OS-1 contributes to DP OS-1 and has an area of 1.7 acres consisting pavement and roadside ditch, generating runoff amounts of Q5= 2.59 cfs and Q100= 5.93 cfs.

Floodplain Statement

According to FEMA's FIRM Nos. 08041CO554G & 08041CO558G (eff. 12/7/2018), portions of this site are within a designated FEMA floodplain. Those areas are shown on the plans.

Construction Cost Opinion

Private Drainage Facilities Improvements (Non-Reimbursable)

Description	Quantity	Unit Price	Cost
4 ft Concrete Drain Pan	1049 LF	$42	$44,058.0
Type L Rip Rap	1.33 Tons	$83	$107.9
		Total	**$44,165.9**

Maintenance

The proposed concrete drain pans will be privately maintained.

Summary

This Final Drainage Report analyzed the development of Falcon Big R Store Expansion owned by Store Master Funding VIII LLC, located at 14155 East Highway 24, Peyton, CO 80831. Runoff from the development will not adversely affect the surrounding or downstream developments. Proposed flows, as detailed in this report, will follow existing drainage patterns and will be safely routed downstream. No public storm drainage modifications or design changes are necessary as a result of the development.

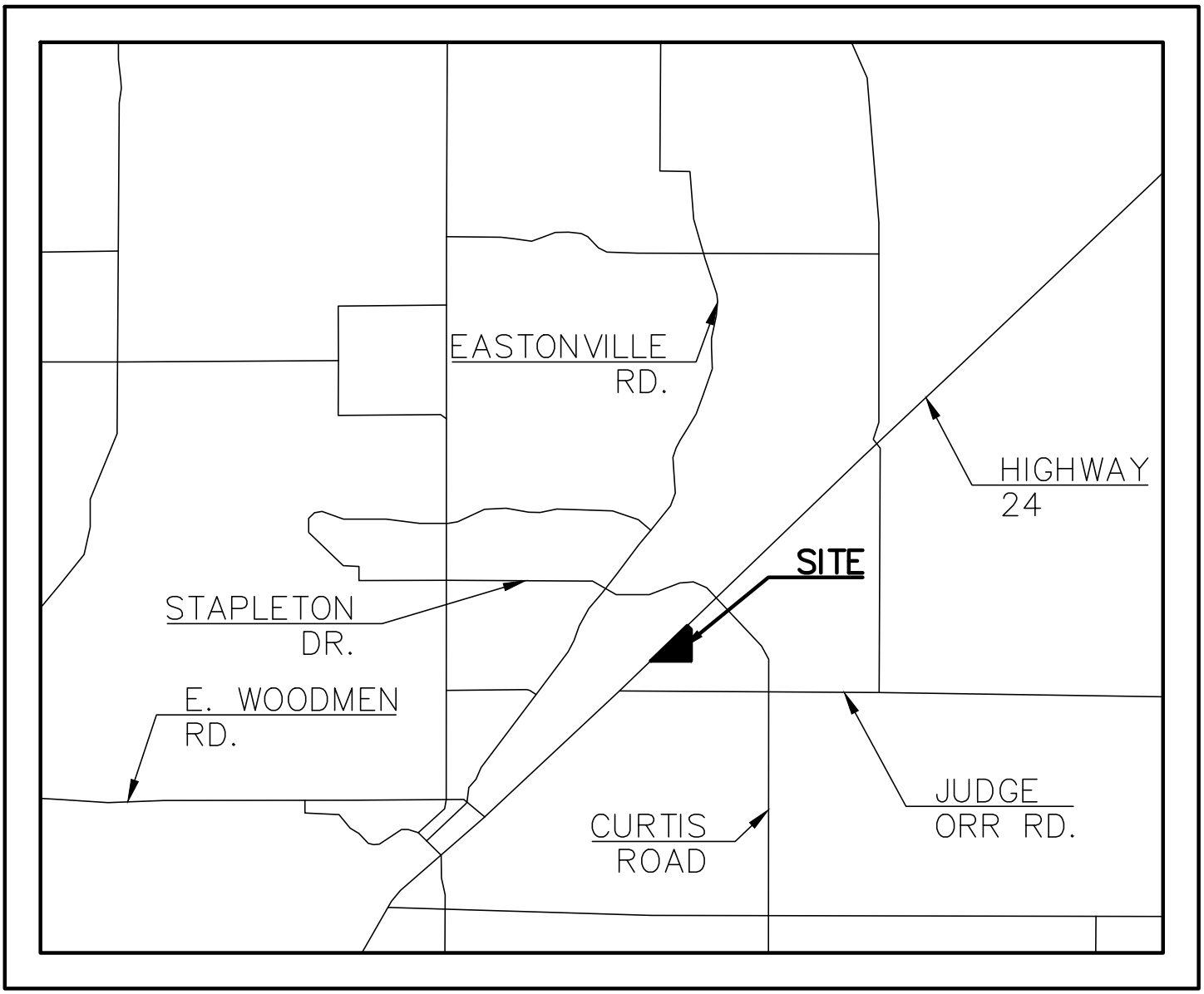
An Erosion Control Plan will be submitted separately.

References

1) *City of Colorado Springs/County of El Paso Drainage Criteria Manual, dated May 2014.*
2) *Soil survey of El Paso County Area, Colorado, Prepared by United States Department of Agriculture Soil Conservation Service*, dated June 1981.
3) *Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map Numbers 08041CO554G & 08041CO558G.*

APPENDICES

VICINITY MAP



VICINITY MAP
N.T.S.

SOILS MAP

Soil Map—El Paso County Area, Colorado

Map Scale: 1:3,950 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 19, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 11, 2018—Oct 20, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	35.9	99.1%
83	Stapleton sandy loam, 3 to 8 percent slopes	0.3	0.9%
Totals for Area of Interest		**36.2**	**100.0%**

El Paso County Area, Colorado

19—Columbine gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367p
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Columbine and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Columbine

Setting

Landform: Flood plains, fan terraces, fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: gravelly sandy loam
C - 14 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XY214CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Fluvaquentic haplaquolls

Percent of map unit: 1 percent

Landform: Swales
Hydric soil rating: Yes

Other soils
Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant
Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 19, Aug 31, 2021

El Paso County Area, Colorado

83—Stapleton sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 369z
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Stapleton and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stapleton

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium derived from arkose

Typical profile

A - 0 to 11 inches: sandy loam
Bw - 11 to 17 inches: gravelly sandy loam
C - 17 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R049XY214CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Fluvaquentic haplaquolls
Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

Other soils
Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant
Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 19, Aug 31, 2021

FEMA FLOODPLAIN MAP

National Flood Hazard Layer FIRMette

FEMA

104°34'17"W 38°57'59"N

104°33'40"W 38°57'31"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- B 20.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/10/2021 at 10:50 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

HYDROLOGIC CALCULATIONS

Big R
Area Runoff Coefficient (C) Summary

HSG - A

EXISTING

		GREENBELT			GRAVEL LOT			PAVEMENT/ROOF			WEIGHTED		WEIGHTED CA	
BASIN	TOTAL AREA	AREA	C5	C100	AREA	C5	C100	AREA	C5	C100	C5	C100	CA5	CA100
	(Acres)	(Acres)			(Acres)			(Acres)						
EX-A	4.1	4.1	0.09	0.36	0.0	0.59	0.70	0.0	0.90	0.96	0.09	0.36	0.37	1.48
EX-B	4.5	4.5	0.09	0.36	0.0	0.59	0.70	0.0	0.90	0.96	0.09	0.36	0.41	1.62
EX-C	10.9	10.9	0.09	0.36	0.0	0.59	0.70	0.0	0.90	0.96	0.09	0.36	0.98	3.92
EX-D	13.4	7.3	0.09	0.36	0.0	0.59	0.70	6.1	0.90	0.96	0.46	0.63	6.15	8.48
EX-E	1.1	0.5	0.09	0.36	0.1	0.59	0.70	0.5	0.90	0.96	0.50	0.66	0.55	0.73
EX-F	0.3	0.0	0.09	0.36	0.0	0.59	0.70	0.3	0.90	0.96	0.90	0.97	0.27	0.29
EX-G	1.3	0.5	0.09	0.36	0.1	0.59	0.70	0.8	0.90	0.96	0.64	0.80	0.83	1.04
EX-H	1.6	1.6	0.09	0.36	0.0	0.59	0.70	0.0	0.90	0.96	0.09	0.36	0.14	0.58
OS-1	1.7	0.9	0.09	0.36	0.0	0.59	0.70	0.8	0.90	0.96	0.47	0.64	0.80	1.09
	34.8													

DEVELOPED

		GREENBELT			GRAVEL LOT			PAVEMENT/ROOF			WEIGHTED		WEIGHTED CA	
BASIN	TOTAL AREA	AREA	C5	C100	AREA	C5	C100	AREA	C5	C100	C5	C100	CA5	CA100
	(Acres)	(Acres)			(Acres)			(Acres)						
A	4.10	4.10	0.09	0.36	0.00	0.59	0.70	0.00	0.90	0.96	0.09	0.36	0.37	1.48
B	4.50	4.50	0.09	0.36	0.00	0.59	0.70	0.00	0.90	0.96	0.09	0.36	0.41	1.62
C	10.90	10.90	0.09	0.36	0.00	0.59	0.70	0.00	0.90	0.96	0.09	0.36	0.98	3.92
D	12.80	7.30	0.09	0.36	0.00	0.59	0.70	5.50	0.90	0.96	0.44	0.62	5.61	7.91
E	3.30	0.90	0.09	0.36	0.00	0.59	0.70	2.40	0.90	0.96	0.68	0.80	2.24	2.63
F	1.60	1.60	0.09	0.36	0.00	0.59	0.70	0.00	0.90	0.96	0.09	0.36	0.14	0.58
OS-1	1.70	0.90	0.09	0.36	0.00	0.59	0.70	0.80	0.90	0.96	0.47	0.64	0.80	1.09

Date: 7/20/2021 Checked by:_____

Big R
Runoff Summary

EXISTING

		WEIGHTED		OVERLAND				SHALLOW CONCENTRATED FLOW				T_C	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Slope (ft/ft)	T_t (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (c.f.s.)	Q_{100} (c.f.s.)
		* For Calcs See Runoff Summary														
EX-A	4.10	0.09	0.36	0.09	300	0.020	25.1	250	2.0%	0.4	11.9	37.0	2.2	3.6	0.81	5.26
EX-B	4.50	0.09	0.36	0.09	80	0.081	8.2	0	4.8%	0.6	0.0	8.2	4.4	7.7	1.76	12.42
EX-C	10.90	0.09	0.36	0.09	300	0.033	21.3	710	1.2%	1.0	11.8	33.1	2.3	3.8	2.30	14.97
EX-D	13.40	0.46	0.63	0.46	300	0.015	17.5	800	1.6%	0.3	44.4	62.0	1.6	2.5	9.91	21.60
EX-E	1.10	0.50	0.66	0.50	100	0.067	5.7	135	1.6%	2.5	0.9	6.6	4.6	8.3	2.57	6.03
EX-F	0.30	0.90	0.97	0.90	0	0.033	0.0	140	20.0%	19.0	0.1	5.0	5.0	9.1	1.36	2.64
EX-G	1.30	0.64	0.80	0.64	90	0.024	5.9	390	1.0%	1.0	6.8	12.7	3.7	6.4	3.09	6.62
EX-H	1.60	0.09	0.36	0.09	300	0.020	25.1	0	5.8%	0.6	0.0	25.1	2.7	4.5	0.39	2.59
OS-1	1.70	0.47	0.64	0.47	0	0.020	0.0	530	0.5%	0.5	17.7	17.7	3.2	5.4	2.59	5.93

DEVELOPED

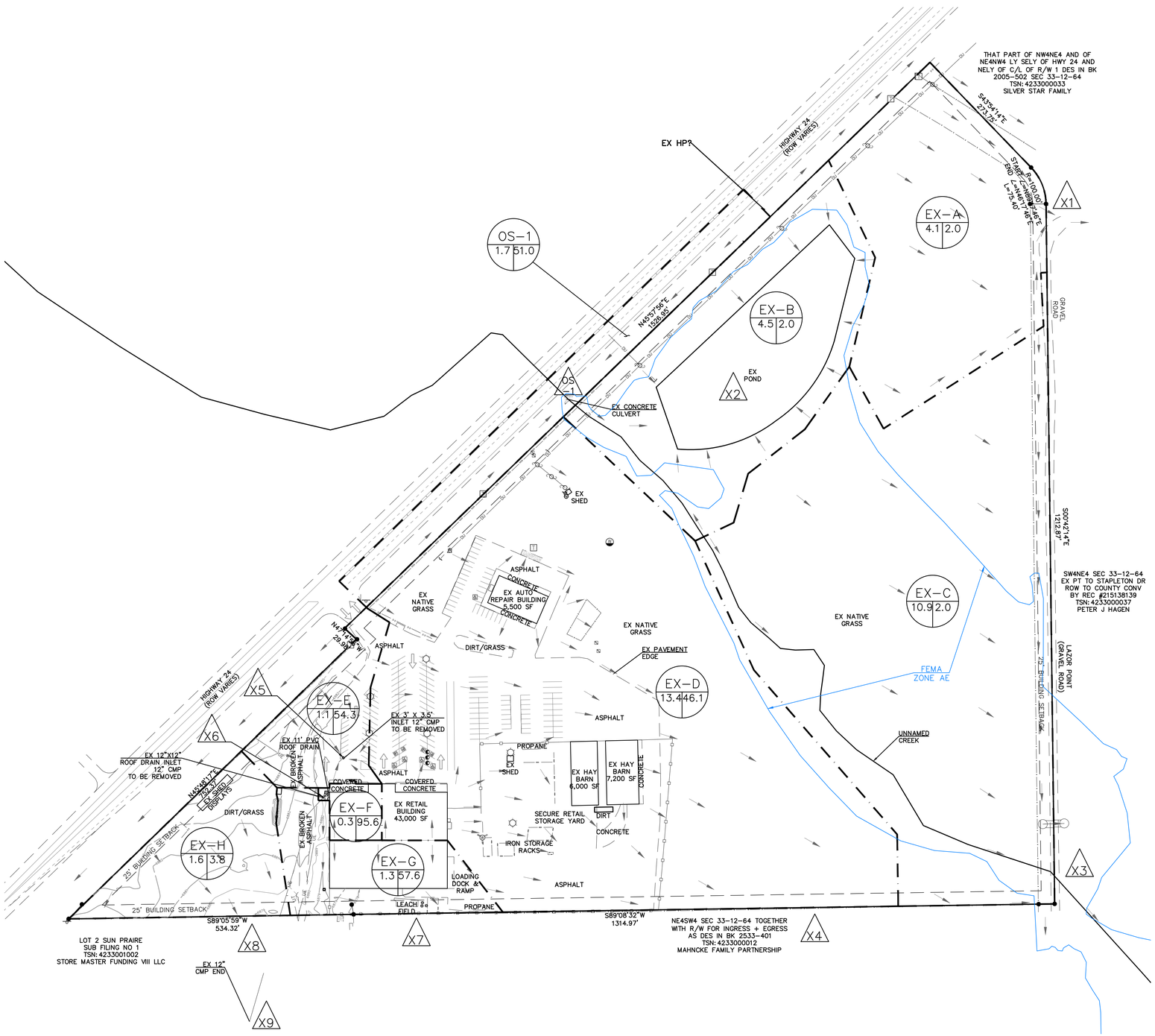
		WEIGHTED		OVERLAND				SHALLOW CONCENTRATED FLOW				T_C	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Slope (ft/ft)	T_t (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (c.f.s.)	Q_{100} (c.f.s.)
		* For Calcs See Runoff Summary														
A	4.10	0.09	0.36	0.09	300	0.02	25.1	250	2.0%	0.4	11.9	37.0	2.2	3.6	0.81	5.26
B	4.50	0.09	0.36	0.09	80	0.08	8.2	0	4.8%	0.6	0.0	8.2	4.4	7.7	1.76	12.42
C	10.90	0.09	0.36	0.09	300	0.03	21.3	710	1.2%	1.0	11.8	33.1	2.3	3.8	2.30	14.97
D	12.80	0.44	0.62	0.44	300	0.02	18.1	800	1.6%	0.3	44.4	62.6	1.6	2.5	8.99	20.01
E	3.30	0.68	0.80	0.68	200	0.03	7.7	990	1.1%	2.1	7.9	15.6	3.4	5.8	7.64	15.19
F	1.60	0.09	0.36	0.09	300	0.02	25.1	0	5.8%	0.6	0.0	25.1	2.7	4.5	0.39	2.59
OS-1	1.70	0.47	0.64	0.47	0	0.02	0.0	530	50.0%	0.5	17.7	17.7	3.2	5.4	2.59	5.93

Big R
Surface Routing

EXISTING CONDITIONS									
Design Point(s)	***Contributing Basins***	***Area (Acres)***	***Equivalent CA_5***	***Equivalent CA_{100}***	***Maximum T_C***	***Intensity***		***Flow***	
						I_5	***I_{100}***	***Q_5***	***Q_{100}***
X1	EX-A	4.10	0.37	1.48	37.0	2.2	3.6	0.81	5.26
X2	EX-B, OS-1	6.20	0.41	1.62	8.2	4.4	7.7	4.35	18.35
X3	EX-C	10.90	0.98	3.92	33.1	2.3	3.8	2.30	14.97
X4	EX-D	13.40	6.15	8.48	62.0	1.6	2.5	9.91	21.60
X5	EX-E	1.10	0.55	0.73	6.6	4.6	8.3	2.57	6.03
X6	EX-F	0.30	0.27	0.29	5.0	5.0	9.1	1.36	2.64
X7	EX-G	1.30	0.83	1.04	12.7	3.7	6.4	3.09	6.62
X8	EX-H	1.60	0.14	0.58	25.1	2.7	4.5	0.39	2.59
OS-1	OS-1	1.70	0.80	1.09	17.7	3.2	5.4	2.59	5.93
X9	EX-E, EX-F	1.40	0.55	0.73	6.6	4.6	8.3	3.93	8.67

PROPOSED CONDITIONS									
Design Point(s)	***Contributing Basins***	***Area (Acres)***	***Equivalent CA_5***	***Equivalent CA_{100}***	***Maximum T_C***	***Intensity***		***Flow***	
						I_5	***I_{100}***	***Q_5***	***Q_{100}***
1	A	4.10	0.37	1.48	37.0	2.2	3.6	0.81	5.26
2	B, OS-1	6.20	0.41	1.62	8.2	4.4	7.7	4.48	18.51
3	C	10.90	0.98	3.92	33.1	2.3	3.8	1.54	10.01
4	D, E	16.10	5.61	7.91	62.6	1.6	2.5	16.63	35.20
5	E	3.30	2.24	2.63	15.6	3.4	5.8	7.64	15.19
6	F	1.60	0.14	0.58	25.1	2.7	4.5	0.39	2.59
OS-1	OS-1	1.70	0.80	1.09	17.7	3.2	5.4	2.59	5.93

DRAINAGE MAPS



LEGEND

- EXISTING CONCRETE
- EXISTING PROPERTY LINE
- EXISTING PAVEMENT EDGE
- EXISTING MINOR CONTOUR (6259)
- EXISTING MAJOR CONTOUR (6260)
- EXISTING SETBACK
- EXISTING IRON FENCE
- EXISTING BARB WIRE FENCE
- EXISTING CHAIN LINK FENCE
- EXISTING ELECTRIC UTILITY
- EXISTING FLOW

N

100' 0 100' 200'

SCALE: 1"=100'

B — BASIN DESIGNATION
AREA IN BASIN (AC) — 1.12 | 7.7 — % IMPERVIOUSNESS
X1 — DESIGN POINT
BASIN BOUNDARY

DRAINAGE SUMMARY

BASIN NAME	AREA (ACRES)	FLOW 5 YR (cfs)	FLOW 100 YR (cfs)
EX-A	4.1	0.81	5.26
EX-B	4.5	1.76	12.42
EX-C	10.9	2.30	14.97
EX-D	13.4	9.91	21.60
EX-E	1.1	2.57	6.03
EX-F	0.3	1.36	2.64
EX-G	1.3	3.09	6.62
EX-H	1.6	0.39	2.59
OS-1	1.7	2.59	5.93

DESIGN POINT SUMMARY

DP	CONTRIBUTING BASINS	AREA AC.	Q5 CFS	Q100 CFS
X1	EX-A	4.1	0.81	5.26
X2	EX-B, OS-1	6.2	4.35	18.35
X3	EX-C	10.9	2.30	14.97
X4	EX-D	13.4	9.91	21.60
X5	EX-E	1.1	2.57	6.03
X6	EX-F	0.3	1.36	2.64
X7	EX-G	1.3	3.09	6.62
X8	EX-H	1.6	0.39	2.59
X9	EX-E, EX-F	1.4	3.93	8.67
OS-1	OS-1	1.7	2.59	5.93

REVISIONS NO.	DESCRIPTION	DATE

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, TERRA NOVA ENGINEERING, INC. APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

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COLORADO SPRINGS, CO 80904
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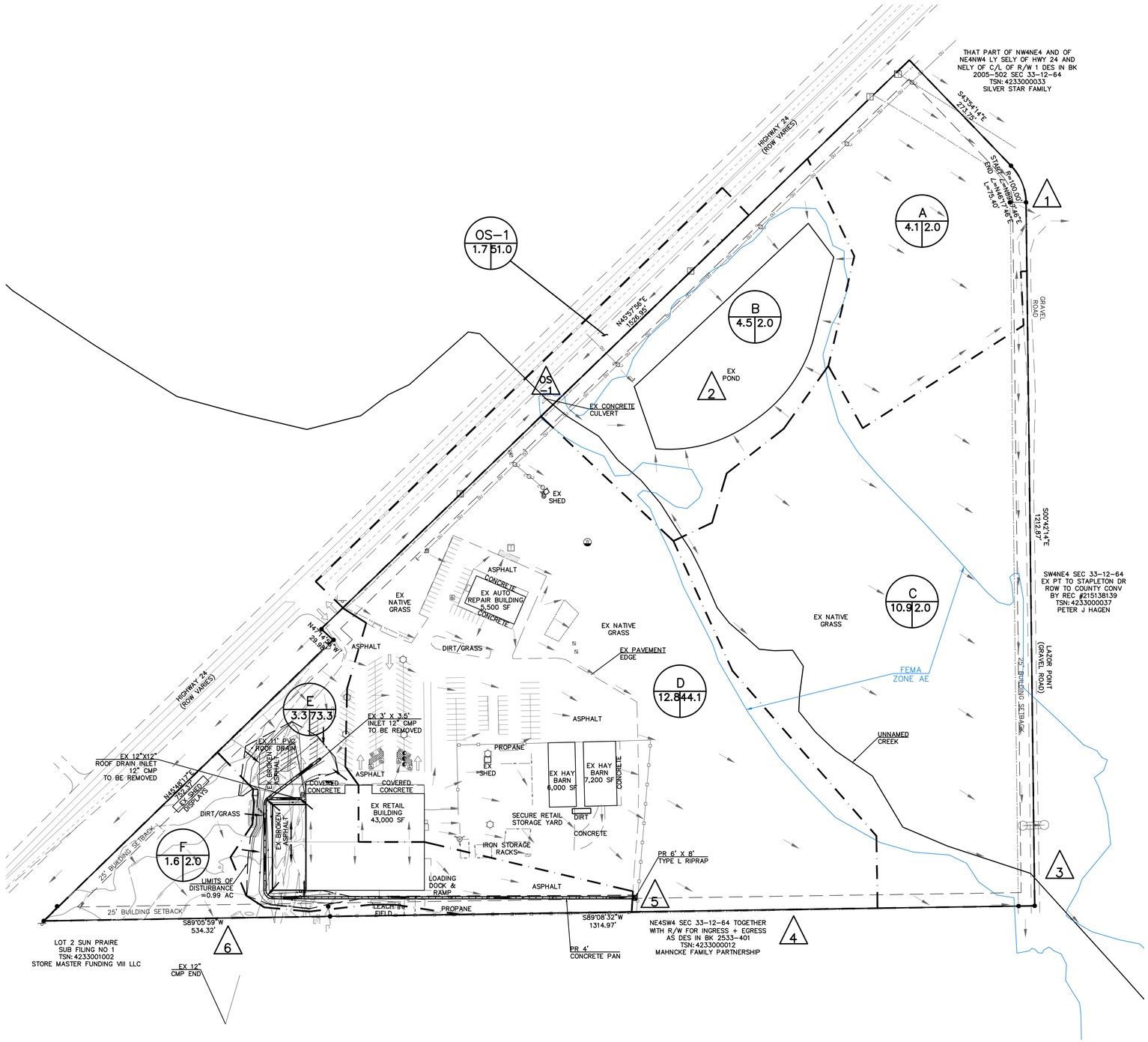
FAX: 719-635-6426
www.tnesinc.com

FALCON BIG R STORE EXPANSION

EXISTING DRAINAGE PLAN

DESIGNED BY JF
DRAWN BY JF
CHECKED BY LD
H-SCALE AS SHOWN
V-SCALE N/A
JOB NO. 2170.00
DATE ISSUED 12/12/21
SHEET NO. 1 OF 2

N:\jobs\2170.00\Drawings\217000 DRAINAGE.dwg, 12/13/2021 1:39:00 PM, DWG To PDF.pc3



LEGEND

- PROPOSED ASPHALT
- EXISTING CONCRETE
- EXISTING PROPERTY LINE
- EXISTING PAVEMENT EDGE
- 6259 EXISTING MINOR CONTOUR
- 6260 EXISTING MAJOR CONTOUR
- 60 PROPOSED CONTOUR
- PROPOSED FLOW
- EXISTING SETBACK
- EXISTING IRON FENCE
- EXISTING BARB WIRE FENCE
- EXISTING CHAIN LINK FENCE
- EXISTING ELECTRIC UTILITY
- PROPOSED CONCRETE PAN
- EXISTING FLOW

N

100' 0 100' 200'

SCALE: 1"=100'

LEGEND

B — BASIN DESIGNATION

AREA IN BASIN (AC) — 1.1 | 77 — % IMPERVIOUSNESS

2 — DESIGN POINT

BASIN BOUNDARY

DRAINAGE SUMMARY

BASIN NAME	AREA (ACRES)	FLOW 5 YR (cfs)	FLOW 100 YR (cfs)
A	4.1	0.81	5.26
B	4.5	1.76	12.42
C	10.9	2.30	14.97
D	12.8	8.99	20.01
E	3.3	7.64	15.19
F	1.6	0.39	2.59
OS-1	1.7	2.59	5.93

DESIGN POINT SUMMARY

DP	CONTRIBUTING BASINS	AREA AC.	Q5 CFS	Q100 CFS
1	A	4.1	0.81	5.26
2	B, OS-1	6.2	4.48	18.51
3	C	10.9	1.54	10.01
4	D, E	16.1	16.63	35.20
5	E	3.3	7.64	15.19
6	F	1.6	0.39	2.59
OS-1	OS-1	1.7	2.59	5.93

REVISIONS

NO.	DESCRIPTION	DATE

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FALCON BIG R STORE EXPANSION

PROPOSED DRAINAGE PLAN

DESIGNED BY JF
DRAWN BY JF
CHECKED BY LD
H-SCALE AS SHOWN
V-SCALE N/A
JOB NO. 2170.00
DATE ISSUED 12/12/21
SHEET NO. 2 OF 2

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